

THE  
CATECHISM

OF THE  
AUTHOR

OF THE  
MINUTE PHILOSOPHER  
FULLY ANSWER'D.

---

By J. WALTON.

---

— *Neque enim lex æquior ulla  
Quam necis Artifices Arte perire sua.* Ovid.

---

---

D U B L I N :

Printed by S. POWELL,

For WILLIAM SMITH at the *Hercules*,  
Bookseller, in *Dame-street*, 1735.

# THE CATECHISM

OF THE  
A U T H O R



OF THE  
MINUTE PHILOSOPHER  
FULLY ANSWER'D.

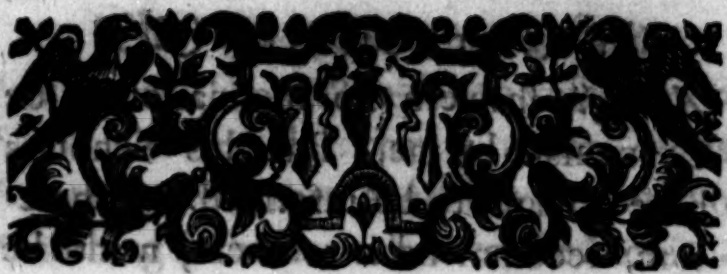
BY J. WATSON.

Quam necesse est uti  
Necesse enim lex equior esse


D O B L I N :

Printed by S. Powell.

For WILLIAM SMITH at the Horse  
Bookeller, in Dame Street, 1735.



# THE CATECHISM, &c.

I. N the Appendix of the *Defence of Free-thinking in Mathematics*, the Author, out of his greatly benevolent and truly Christian Spirit, has composed a CATECHISM which he recommends to my Scholars: This CATECHISM with its Introduction I shall transcribe in his own Words, and fully and distinctly answer the several Questions contained therein.

## The INTRODUCTION.

II. “**T**HIS Vindicator, indeed, by  
“ his dissembling nine Parts  
“ in ten of the Difficulties proposed in the



## The CATECHISM.

“ *Analyst*, sheweth no Inclination to be  
 “ CATECHISED by me. But his Scholars  
 “ have a Right to be informed. I there-  
 “ fore, recommend it to them, not to be  
 “ imposed on by hard Words and magis-  
 “ terial Assertions, but carefully to pry  
 “ into his Sense, and sift his Meaning,  
 “ and particularly to insist on a distinct  
 “ Answer to the following Questions.

## The CATECHISM.

“ **L**ET them ask him, whether he  
 “ can conceive Velocity without  
 “ Motion, or Motion without Extension,  
 “ or Extension without Magnitude? If  
 “ he answers that he can, let him reach  
 “ them to do the same. If he cannot,  
 “ let him be asked, how he reconciles  
 “ the Idea of a Fluxion which he gives  
 “ (P. 13.) with common Sense? Again,  
 “ let him be asked, whether nothing be  
 “ not the Product of nothing multiply’d  
 “ by something? And if so, when the  
 “ Difference between the Gnomon and  
 “ the Sum of the Rectangles vanisheth,  
 “ whether



## The CATECHISM, &c.

“ whether the Rectangles themselves do  
“ not also vanish? that is, when  $ab$  is  
“ nothing, whether  $A b + B a$  be not also  
“ nothing? that is, whether the Momen-  
“ tum of  $AB$  be not nothing? Let him  
“ then be asked, what his Momentums  
“ are good for, when they are thus brought  
“ to nothing? Again, I wish he were  
“ asked to explain the Difference be-  
“ tween a Magnitude infinitely small and  
“ a Magnitude infinitely diminish’d? If  
“ he saith there is no Difference, then  
“ let him be asked, how he DARES to  
“ explain the Method of Fluxions by the  
“ *Ratio* of Magnitudes infinitely dimi-  
“ nish’d (P. 9.) when Sir *Isaac Newton*  
“ hath expressly excluded all Considera-  
“ tion of Quantities infinitely small? If  
“ this able Vindicator should say that  
“ Quantities infinitely diminish’d are no-  
“ thing at all, and consequently that,  
“ according to him, the first and last  
“ *Ratios* are Proportions between no-  
“ things, let him be desired to make  
“ Sense of this, or explain what he means  
“ by *Proportion between nothings*. If  
“ he should say the ultimate Proportions  
“ are

## The CATECHISM, &amp;c.

" are the Ratios of mere Limits, then  
 " let him be asked how the Limits of  
 " Lines can be proportioned or divided?  
 " After all, who knows but this Gentle-  
 " man, who hath already complained of  
 " me for an uncommon Way of treating  
 " Mathematics and Mathematicians, may  
 " (as well as the *Cantabrigian*) cry out  
 " *Spain* and the *Inquisition* when he  
 " finds himself thus closely pursued and  
 " beset with Interrogatories? That we  
 " may not therefore seem too hard on an  
 " innocent Man, who probably meant  
 " nothing, but was betray'd by following  
 " another into Difficulties and Straits that  
 " he was not aware of, I shall propose  
 " one single Expedient, by which his  
 " Disciples (whom it most concerns) may  
 " soon satisfy themselves, whether this  
 " Vindicator really understands what he  
 " takes upon him to vindicate. It is in  
 " short, that they would ask him to ex-  
 " plain the second, third or fourth Fluxi-  
 " ons upon his Principles. Be this the  
 " Touchstone of his Vindication. If he  
 " can do it, I shall own my self much  
 " mistaken: If he cannot, it will be evi-  
 " dent

## The CATECHISM, &c.

“dent that he was much mistaken in  
“himself, when he presumed to defend  
“Fluxions without so much as knowing  
“what they are. So having put the Me-  
“rits of the Cause on this Issue, I leave  
“him to be tried by his Scholars.

III. In this CATECHISM I am first  
to be asked, “Whether I can conceive  
“Velocity without Motion, or Motion  
“without Extension, or Extension with-  
“out Magnitude? ” These Questions are  
more clearly express’d in the 29th and  
30th Queries of his *Analyst*, where he asks,  
“Whether we can form an Idea or Notion  
“of Velocity distinct from and exclusive  
“of its Measures? Whether Motion can  
“be conceived in a Point of Space? And  
“if Motion cannot, whether Velocity  
“can? And if not, whether a first or last  
“Velocity can be conceived in a mere Li-  
“mit, either initial or final, of the describ-  
“ed Space? ” I answer, I can conceive  
Velocity and Motion in a *Point of Space* ;  
that is without any assignable Length or  
Extension described by it, and so might  
he too if he had understood and consid-  
der’d



## The CATECHISM, &amp;c.

der'd the Nature of Motion. For Motion is an Effect of some Cause acting on the Thing moved; which Effect, setting aside all Resistance, will ever be proportional to the whole Action of the generating Cause: And therefore if a Cause acts continually upon a given Thing without any Interruption, there must be a continual Increase of its Velocity: The Velocity cannot be the same in any two different Points of the Space described, however near those Points may be to each other. For if it was, there must be a Cessation of the Action of the moving Cause during the Passage of the Thing thro' the Space comprehended between the two Points; which is contrary to the Supposition.

If

# FULLY ANSWER'D.

9

If the Thing moved be a Point, and the Space described by this Point setting out from a State of Rest at A, be AD;

A and if the Point be acted upon con-

tinually by a moving Cause during the Time of its going from A to D,

and the Cause act continually with the same Degree of Strength during

that Time; the Velocity will con-

C- tinually increase with the Time of the Motion, or with the Square

Root of the Space described; that

D is, the Velocities in the Points C and D, will be in the same Proportion as the Times of describing AC and AD, or as the Square Roots of AC and AD.

These are the Laws of Motion observed by Bodies falling from small Heights to the Surface of the Earth, setting aside the Resistance of the Air, and supposing the Bodies to have exactly the same Weights during the Times of their Fall.

If the Cause acts continually upon the moving Point, but with different Degrees of Strength during the Time of the Motion; the Velocity will not increase with the Time, nor with the Square Root of the

B

Space

## The CATECHISM

Space described; but will still increase from the Beginning to the End of the Motion, and not be the same in any two different Points of the Space described, however near to each other. Let the Velocity increase with the  $n$  Power of the Time, that is, let  $V$  be as  $T^n$ ; and then  $V$  will be as  $\frac{1+n}{1} \times S \frac{n}{1+n}$  or as  $S \frac{n}{1+n}$ , putting  $S$  for the Space describ'd: Whence it appears that the Velocity will not be the same in any two different Points of the Space described: For it must vary upon the least Change of the Space  $S$ , and consequently be different in every different Point of  $AD$ ; which shews that this Author has been greatly mistaken in imagining that there can be no Motion, no Velocity, in a Point of Space.

IV. The next Questions in the CATECHISM, depending upon each other, run thus. " Let him be asked, whether  
 " nothing be not the Product of nothing  
 " multiply'd by something? And if so,  
 " when the Difference between the Gno-  
 " mon



“ mon and Sum of the two Rectangles  
 “ vanisheth, whether the Rectangles  
 “ themselves do not also vanish? that is  
 “ when  $ab$  is nothing, whether  $A b + B a$   
 “ be not also nothing? that is, whether  
 “ the Momentum of  $A B$  be not nothing?  
 “ And let him be asked what his Mo-  
 “ mentums are good for when thus they  
 “ are reduced to nothing?” As to the  
 first of these Questions I agree with him  
 that nothing is the Product of nothing  
 multiply'd by something; but must know  
 what he means by the vanishing of  
 the Gnomon and Sum of the two  
 Rectangles in the second, before I give  
 him a direct Answer. If by vanishing he  
 means that they vanish and become no-  
 thing as Areas, I grant they do; but ab-  
 solutely deny, upon such an Evanescence  
 of the Gnomon and Sum of the two Rect-  
 angles by the moving back of the Sides  
 of the Gnomon till they come to coin-  
 cide with those of the Rectangle, that  
 nothing remains. For there still remain  
 the moving Sides, which are now become  
 the Sides of the Rectangle; into which  
 Sides both the Gnomon and the Sum of

the two Rectangles are now turned by this retroverted Motion. And as the Gnomon and Sum of the two Rectangles, upon the Evanescence of their Areas by this retroverted Motion, are both converted into the two Sides of the Rectangle A B, so in the Instant of that Conversion, their Motions are exactly the same; or the Motion of the Gnomon is the same with the Sum of the Motions of the two Rectangles, when they evanesce, and are converted into the two Sides of the Rectangle A B.

If a Point moves forward to generate a Line, and afterwards the same Point moves back again to destroy the Line with the very same Degrees of Velocity, in all Parts of the Line which it had in those Parts when moving forward to generate it; in the Instant the Line vanishes as a Length, nothing of a Line will remain; but still the generating Point will remain, together with the Velocity it had at the very Beginning of its Motion. And the Case is the very same with respect to a Rectangle increasing by the Motion of  
its

its Sides: For upon the Evanescence of a generated Gnomon, there still remain the Sides of the Rectangle into which the Gnomon by its Evanescence is converted, together with the Velocities of those Sides; that is, when the Gnomon evanescs there still remains  $A b + B a$ .

To make this more evident to Sense; let the Point which generated the Line

A A D, move back again from D to C with the very same Degrees of Velocity in every Part of the Increment CD which it had in that Part in moving forward from C to D; and when the Increment CD evanescs and becomes nothing as a Line by being converted into the moving Point in C; there will remain ~~that~~ that Point together with its Motion in C; for neither the Point nor its Motion in C is destroy'd by the Evanescence of the Line CD.

If

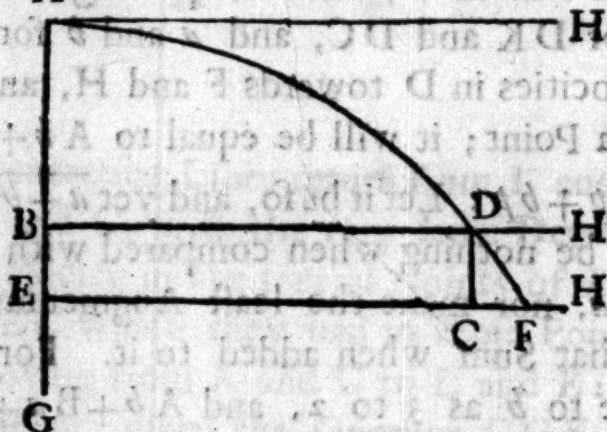




Sides being destroy'd by the Evanescence of the Area of the Gnomon. But perhaps he will say, that when the Gnomon evanesces it turns into something more than the Sum of the Sides DK and DC: For the Rectangles LD and FC turn into those Sides, and the Rectangle FH turns into a Point at D; and therefore the Motion of the Gnomon in the Instant it evanesces, will become the Sum of the Motions of the Sides DK and DC, and of the Point in D; that is, putting A and B for DK and DC, and  $a$  and  $b$  for the Velocities in D towards F and H, and  $p$  for a Point; it will be equal to  $Ab + Ba + ap + bp$ : Let it be so, and yet  $a + b \times p$  will be nothing when compared with  $Ab + Ba$ , nor make the least Augmentation to that Sum when added to it. For let  $a$  be to  $b$  as 3 to 2, and  $Ab + Ba + ap + bp$  will be  $2A + 3B + 5p$ : But  $5p$  or five Points added to a Line, make nothing but the Line itself; a Point being no Part of a Line; and consequently not in the least increasing its Length when added to it: And therefore the Motion of the Gnomon when it evanesces and turns

turns into the Sides of the Rectangle CDK, will be  $Ab + Ba$ , as Sir *Isaac Newton* makes it.

If the Curvilinear Area ABD be generated by the Motion of any indefinite Line AH down AG, while a Point setting out from A moves in the Line AH from A towards H; and if from a Continuance of these two Motions that Area be increased by the Augment BDFE,



consisting of the Rectangle BC and of the Triangle CFD; the Motion with which the Increment BDFE begins to be generated, is the Sum of the two Motions towards C and H in the Point D; which Sum, putting  $b$  for the Velocity towards C,  $a$  for the Velocity towards H and



and  $p$  for a Point, will be  $\overline{BD \times b + ap}$ . Now suppose the Ordinate  $EF$  to move back to  $BD$ , and the Point  $F$  to move back in the Line  $HE$  to  $C$ , and that in moving back they have the same Degrees of Velocity in every Point of  $EB$  and  $EH$ , which they had before in moving forward; it is manifest, that when the Augment  $BDFE$  vanishes and becomes nothing as an Area, by being converted into the Ordinate  $BD$ , and into a Point at the Extremity of that Ordinate; there will remain  $BD$  and the Point in  $D$ , together with their Velocities in that Point; for the Motions of that Line and Point, are not destroy'd by the Evanescence of the Area  $BDFE$ . In the Instant  $EF$  coincides with  $BD$ , and the Point  $F$  with  $D$ , the Area  $BDFE$  will be converted into  $BD + p$ , and its Motion will become  $BD \times b + pa$ , as before. But  $pa$ , being only so many Points as  $a$  contains Units, is really and truly nothing with respect to  $BD \times b$ ; and consequently does not at all increase it when added to it. And therefore the *Fluxion* of the curvilineal Area  $ABD$ , will be  $BD \times b$ ; or as  $BD$  if  $b$

## The CATECHISM

be given, or the Line  $AH$  move down  $AG$  with a Velocity which is exactly the same in every Part of  $GA$ .

Hence it appears, that if mathematical Quantities be increased in equal Times by Motion, their isochronal Increments must be made to vanish by a Retroversion of the Motion, before we can obtain the Motions with which they vanish, or begin to be generated; that is, before we can obtain the *Fluxions* of the Quantities, the Name given by Sir *Isaac Newton* to those Motions. So then, this Author has been much out in supposing that upon the Evanescence of the Gnomon  $CGK$ , or of the curvilinear Figure  $BDFE$ , the Momentum or *Fluxion* of the Rectangle  $CDK$ , or of the Area  $ABD$ , vanishes. Consequently, he has been greatly mistaken in every one of these Questions.

V. But he goes on. " I wish he were  
 " asked to explain the Difference between  
 " a Magnitude infinitely small and a Mag-  
 " nitude infinitely diminished. If he  
 " saith there is no Difference: Then let  
 " him

“ him be further asked, how he DARES  
“ to explain the Method of Fluxions by  
“ the *Ratio* of Magnitudes infinitely di-  
“ minish'd, when Sir *Isaac Newton* hath  
“ expressly excluded all Consideration of  
“ Quantities infinitely small? If this able  
“ Vindicator shou'd say that Quantities  
“ infinitely diminish'd are nothing at all,  
“ and consequently that, according to  
“ him, the first and last *Ratios* are Pro-  
“ portions between nothings, let him be  
“ desired to make Sense of this, or ex-  
“ plain what he means by *Proportion*  
“ *between nothings*. If he shou'd say  
“ the ultimate Proportions are the *Ratios*  
“ of mere Limits, then let him be asked  
“ how the Limits of Lines can be pro-  
“ portioned or divided?

As all this Part of the CATECHISM relates to the Measures of Fluxions by the first and last *Ratios* of isochronal Increments generated and destroy'd by Motion, so I have taken it together, and shall answer the whole in one Section.



## The C A T E C H I S M

Neither Sir *Isaac Newton* nor I have said, that *Fluxions* are measured by the Proportions of Magnitudes infinitely small, nor by the Proportions of any Magnitudes whatever generated in equal Times; but that *they are measured by the first or last Proportions of isochronal Increments generated or destroy'd by Motion*; which Proportions are the *Ratios* with which such Increments begin to exist before they have acquired any Magnitude, or with which they cease to exist and vanish after they have lost all Magnitude. These *Ratios* subsist when the isochronal Increments have no Magnitude, for as much as the Motions subsist with which those Increments, *just now, in this very Instant*, begin or cease to exist; to which Motions these *Ratios* are proportional.

For Example, the first or last *Ratio* of the Increments C D and E F generated in equal Times, has a real Existence; for as much

as

as it is equal to the *Ratio* of the Motions

A B in C and E, which are the Motions subsisting in those Points when the isochronal Increments *just* begin or cease to exist.

The Existence of the Motions preserves the Existence of *these Ratios* of the Increments CD and EF. If the *Ratio* of the Motions in C and E, be that of 4 to 3; the first or last *Ratio* of the isochronal Increments CD and EF, will likewise be that of

4 to 3, even tho' no Part of those Increments has any Existence.

The Motions in C and E, are as the moving Quantities and Velocities taken together; or as two Points and their Velocities, taken together; or as the Velocities, all Points being equal. And the first or last *Ratio* of the isochronal Increments CD and EF, is compounded of the first or last *Ratio* of these Spaces, and of the *Ratio* of the moving Quantities. For the Velocities in C and E being in the first or last *Ratios* of these isochronal

## The CATECHISM

isochronal Spaces, the Motions, which are as the moving Quantities and Velocities taken together, will be as the same moving Quantities and the first or last *Ratio* of the isochronal Spaces taken together. If  $Q$  and  $q$  denote the moving Quantities in  $C$  and  $E$ ,  $V$  and  $v$  their Velocities,  $S$  and  $s$  the isochronal Spaces  $CD$  and  $EF$ , and  $\dot{S}$  and  $\dot{s}$  the first or last *Ratio* of those isochronal Spaces; then  $QV$  will be to  $qv$ , as  $Q\dot{S}$  to  $q\dot{s}$ ; and in this case  $V$  will be to  $v$ , as  $\dot{S}$  to  $\dot{s}$ , because  $Q$  and  $q$  are equal.

Again, the first or last *Ratio* of the isochronal Spaces  $FD$  and  $DH$  in the augmented Rectangle  $EGL$  (See the *Figure* in *Page 14.*) has a real Existence; for as much as it is equal to the *Ratio* of the two Motions of two Points in  $D$ , of one towards  $F$ , and the other towards  $H$ ; which Motions, subsisting when the isochronal Spaces  $FD$  and  $DH$  are nothing, preserve the Existence of the first or last *Ratio* of these Spaces, or keep it from being a *Ratio of nothings*. If  $V$  and  $v$ , denote the Velocities in  $D$  towards  $F$  and



and  $H$ ,  $Q$  and  $q$  the Sides of the Rectangle  $DK$  and  $DC$ , and  $S$  and  $s$  the first or last *Ratio* of the isochronal Spaces  $FD$  and  $DH$ ; then  $Qv$  will be to  $qV$ , as  $Qs$  to  $qs$ ; but  $Qv + qV$  is the Fluxion or Motion of the Rectangle  $CDK$ , as I have shewn before; and therefore the Moment or Measure of the Fluxion of the Rectangle will be  $Qs + qs$ . This is a full and clear Answer to this Part of the CATECHISM, and shews that its Author has been greatly mistaken in supposing that I explained the Doctrine of Fluxions by the *Ratio of Magnitudes infinitely deminish'd*, or by *Proportions between nothings*.

VI. I come now to the last Part of the CATECHISM, which stands thus.  
 “ I shall propose one single Expedient,  
 “ by which his Disciples (whom it most  
 “ concerns) may soon satisfy themselves,  
 “ whether this Vindicator really under-  
 “ stands what he takes upon him to vindi-  
 “ cate. It is in short, that they wou’d ask  
 “ him to explain the second, third, or fourth  
 “ Fluxions upon his Principles. Be this  
 “ the

“ the Touchstone of his Vindication :  
 “ If he can do it, I shall own my self  
 “ much mistaken : If he cannot it will  
 “ be evident that he was much mistaken  
 “ in himself, when he *presumed* to de-  
 “ fend Fluxions without so much, as  
 “ knowing what they are. So having  
 “ put the Merits of the Cause on this  
 “ Issue, I leave him to be tried by his  
 “ Scholars.

I do not wonder that this Author shou'd  
 have no clear Ideas or Conceptions of  
 second, third or fourth Fluxions, when  
 he has no clear Conceptions of the com-  
 mon Principles of Motion, nor of the first  
 and last *Ratios* of the isochronal Increments  
 of Quantities generated and destroy'd  
 by Motion. For Fluxions, according to Sir  
*Isaac Newton*, are the *Motions* with which  
 the isochronal Increments of Quantities be-  
 gin or cease to exist, or the Motions of the  
 generating Quantities in the very Limits  
 or Extremities of the *Fluents* : Thus  
 the Fluxions of Solids are the Motions of  
 Surfaces; the Fluxions of Surfaces, the  
 Motions of Lines; the Fluxions of Lines,  
 the

the Motions of Points; and the Fluxions of Points are nothing, for Points in their own Nature are invariable, and therefore incapable of being generated or increased by Motion: And if the first Fluxions of Quantities be Motions, it follows, that the Mutations of these Motions and the Mutations of those Mutations, which are the second and third Fluxions of the Quantities, must likewise be Motions.

First, second and third Fluxions do really exist, and may be clearly and distinctly conceiv'd by attending to the Motions of the several Parts of a Cube, namely, of its Surfaces of their Lines and Points, in the Instant it begins to be increas'd by Motion. For if  $A$  denotes the Side of a Cube generated by an uniform Motion, whose Velocity is express'd by  $a$ ; the first Fluxion of the Cube, according to these Principles, will be expressed by  $3aA^2$ ; its second Fluxion, which is the Fluxion of  $3aA^2$ , will be expressed by  $6a^2A$ , or by  $6aA \times a$ ; its third Fluxion, which is the first Fluxion of  $6a^2A$ , will be express'd by  $6a^3$  or by  $6a^2 \times a$ ; and its fourth Fluxion will

D

be



be nothing: But all these Fluxions or Motions do exist, and may be clearly and distinctly conceived in the Motion of a Cube, at the very End of its Generation, or at the very Beginning of its Augmentation, by Motion; for it begins to be augmented by the Sum of the Motions of three of its Squares comprehending any one of its solid Angles, each of which Squares being denoted by  $A^2$  and their Velocity outward by  $a$ , the Fluxion of the Cube or the Motion with which it begins to increase or to be enlarged, will be  $3aA^2$ ; and this is the first Fluxion of the Cube; and the three moving Squares begin to be augmented, in the very same Instant wherein the Cube begins to enlarge, each by the Sum of the Motions of its two adjoining Sides, and consequently the Motions of those Sides to augment the cubic Surface, will be express'd by  $6aA$ , but that Surface at the same Instant of Time moves outward to augment the Solid with a Velocity which is also denoted by  $a$ , and therefore the whole Motion of the six moving Sides of the three Squares for increasing  
or

or enlarging the Cube, will be expressed by  $6aA \times a$  or by  $6a^2A$ ; and this is the second Fluxion of the Cube; and when the three moving Squares begin thus to increase, sideways and outwards, for the Enlargement of the Cube, their six moving Sides begin to be augmented by the Motion of six Points; and the common Velocity of those Points in order to increase the Sides of the Squares, being the same with the Velocity of those Sides to increase the Cubic Surface, and with the Velocity of that Surface to augment the Solid; the whole Motion with which those Points begin to enlarge the Cube, will be express'd by  $6a^3$  or by  $6a^3p$ ; and this is the third Fluxion of the Cube: These three Kinds of Motion do all necessarily exist and may be clearly and distinctly conceived in the System of Motion whereby a Cube begins to be augmented: And therefore the first, second and third Fluxions of Quantities may be distinctly conceived, and fully explained upon the Principles of Sir *Isaac Newton*.

As first, second and third Fluxions are explained by the several Motions necessarily existing in the very Instant a Cube begins to be augmented, so they may likewise be explain'd and distinctly comprehended, by considering the nascent or evanescent Increments of the several Parts of a Cube, generated by Motion; provided always that by nascent or evanescent Increments be understood not generated Increments of any Magnitude whatever, but only such Quantities or Magnitudes as are proportional to and Consequently Measures of the Motions with which those isochronal Increments begin or cease to exist. For if  $a$ , which before denoted Velocity, be now put for the first or last *Ratio* of the Space described by that Velocity in a given Time;  $3aA^2$  will denote the nascent Increment of the Cube generated by the Motion of three of its Squares comprehending any one of its solid Angles, and  $6aA$  will express the Sum of the nascent Increments of the three moving Squares, which Sum multiply'd into  $a$  will be the Increment of the nascent Solid  $3aA^2$ ; consequently

$6a^2A$



$6a^2A$  will be the second nascent Increment of the Cube; and the nascent Increment of  $6Aa$ , or of six Rectangles each denoted by  $Aa$ , will be  $6a^2$ , which multiply'd into  $a$  gives  $6a^3$  for the nascent Increment of  $6a^2A$ , and therefore  $6a^3$  is the third nascent Increment of the Cube: All this may be clearly conceiv'd and made evident to Sense by the *Figure* in *Page 14*. For let  $CDK$  represent one of the three moving Squares comprehending any of the solid Angles of a Cube increasing by Motion, and then three times  $CDK$  multiply'd into  $a$ , or  $3aA^2$ , will expound the first nascent Increment of the Cube; and  $3FC + 3LD$  or  $6Aa$  (which is the nascent Increment of the three moving Squares) multiply'd into  $a$ , will be the second nascent Increment of the Cube; and, the Rectangle  $FH$  or  $a^2$  being the nascent Increment of the Rectangle  $FC$  or  $LD$ , and  $2FH$  or  $2a^2$  the nascent Increment of  $FC + LD$  or of  $2Aa$ , and  $6a^2$  the nascent Increment of  $6Aa$ , it follows that  $6a^2$  multiply'd into  $a$ , or that  $6a^3$ , will be the nascent Increment of  $6Aa^2$ , and consequently the

## The CATECHISM

the third nascent Increment of the Cube. And these three distinct Orders of Increments, all begin to exist together, in the very Instant the Cube begins to be augmented by Motion.

This may serve as an Answer to the last Part of the CATECHISM, concerning the Author's *Touchstone* of my *Vindication*: Whether he will own himself *mistaken* I know not; but I think he ought after his unjust and shameful Treatment of Sir Isaac Newton; who in the *Introduction* to his *Quadrature of Curves*, in the *second Lemma* of the *second Book*, and in the *Scholium* to the *first Section* of the *first Book* of his *Principles of Philosophy*, has deliver'd his Doctrine of *Fluxions* in so clear and distinct a Manner, without the least *Inconsistency* in Terms or Arguments, that one wou'd have thought it impossible for any Person not to have understood him, particularly for this Author, who says, *he had long and maturely considered those Principles, and taken as much pains as any*

*any Man living to understand and make Sense of them.*

I have now done with the CATECHISM; but beg leave before I conclude this Paper, in order to prevent my being CATECHISED any more by this Author, to give the World a short Account of some Part of my Faith in Religion. I believe that there is one supreme, incorporeal, ever-living, intelligent and omnipresent Being, called GOD, who made and governs the World. I believe that GOD is endued with infinite Power, Knowledge, Wisdom and Goodness; and that to *deny* or *limit* any one of these Attributes, is in Effect to *deny* a GOD. I believe, that to say GOD *cannot* create Spirits with a Power, inherent in themselves and resulting from their own Frame and Make, of perceiving and knowing Things of a quite different Nature from their own, by Ideas and Sensations, is in Effect to *deny* a GOD; for as much as by this Principle his Almighty Power is denied. And lastly, I believe that this Supreme Being has revealed his Will to Mankind by



## The CATECHISM

by *Moses*, the Prophets, *Jesus Christ* and the Apostles; and that the Doctrine by them deliver'd is therefore divine, and cannot be altered by any Power or Authority upon Earth, nor even by an Angel from Heaven, who is pronounced accursed shou'd he preach any other *Gospel* than what is delivered.

F I N I S.



glo

T